

Part 2: Rules for detailed measurement of building works

2.1 Introduction

- 2.1.1** Part 2 of the rules describes the purpose and uses of *NRM 2: Detailed measurement for building works*; describes the types of bill of quantities (BQ); gives guidance on the preparation and composition of BQ; and defines the information required to enable a BQ to be prepared. Part 2 also sets out the rules of measurement of building items, and the rules for dealing with preliminaries, non-measurable works, and contractor designed works, as well as risks, overheads and profit, and credits.
- 2.1.2** In addition, Part 2 of the rules deals with other aspects of BQ production, including price fluctuations, director's adjustments, daywork and value added tax. Guidance is also provided on the codification of BQ, the use of BQ for cost control and cost management, and the analysis of a BQ to provide cost data.

2.2 Purpose of bill of quantities

- 2.2.1** The primary purposes of a bill of quantities (BQ), which becomes a contract document, are:
- to provide a co-ordinated list of items, together with their identifying descriptions and quantities, that comprise the works to enable contractors to prepare tenders efficiently and accurately; and
 - when a contract has been entered into, to:
 - provide a basis for the valuation of work executed for the purpose of making interim payments to the contractor; and
 - provide a basis for the valuation of varied work.
- 2.2.2** Essentially, a BQ is a list of the items with detailed identifying descriptions and quantities, which make up the component parts of a building.

2.3 Benefits of bill of quantities

- 2.3.1** Irrespective of what contract strategy is used, at some stage in the procurement process one party will need to quantify the extent of works to be executed; whether it be the employer's quantity surveyor/cost manager, the main contractor or the work package contractors for the purpose of obtaining a price for completing building works, valuing the extent of work complete for purposes of payment, valuing variations in the content or extent of building works, or to support applications for tax or other financial incentives. Consequently, detailed measurement for the purpose of bill of quantities (BQ) production is beneficial for a number of reasons:
- it saves the cost and time of several contractors measuring the same design in order to calculate their bids for competition;
 - it provides a consistent basis for obtaining competitive bids;
 - it provides an extensive and clear statement of the work to be executed;
 - it provides a very strong basis for budgetary control and accurate cost reporting of the contract (i.e. post contract cost control), including:
 - the preparation of cash flow forecasts,
 - a basis for valuing variations, and
 - a basis for the preparation of progress payments (i.e. interim payments);
 - it allows, when BQ items are codified, reconciliation and any necessary transfers and adjustments to be made to the cost plan;

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- when priced, it provides data to support claims for tax benefits (e.g. capital allowances and value added tax (VAT));
- when priced, it provides data to support claims for grants; and
- it provides one of the best sources of real-time cost data, which can be used for estimating the cost of future building projects (i.e. historic cost information (see 2.17)) as it provides a cost model in a single document.

2.4 Types of bill of quantities

2.4.1 The use of bill of quantities in support of a contract is the traditional and proven means of securing a lump-sum price for undertaking building works. Bill of quantities (BQ) can be:

- firm (to obtain a lump-sum price for a fully designed building project); or
- approximate (subject to remeasurement as built).

2.4.2 Firm bill of quantities:

2.4.2.1 The reliability of the tender price will increase in relation to the accuracy of the quantities provided (i.e. the more precisely the work is measured and described). In theory, were there no design changes, then a firm BQ would provide a price at tender stage, which would equal the final cost. In practice there will be changes, and the BQ provides a good basis for cost control, since the direct cost of change can be assessed with reference to the BQ rates.

2.4.2.2 The firmer the BQ the better it is as a means of financial control.

2.4.3 Approximate bill of quantities:

2.4.3.1 Approximate BQ are used when there is insufficient detail to prepare firm BQ or where it is decided by the employer that the time or cost of a firm BQ is not warranted. Such contracts do not provide a lump-sum price, but rather tender price totals (i.e. a quantified schedule of rates), since the quantities are subject to re-measurement on completion by the quantity surveyor/cost manager. These contracts are usually subject to greater variation than lump sum contracts and therefore should only be used where time is a limiting factor or where there is great uncertainty in respect of certain elements, such as major excavation and earthworks.

2.4.3.2 The initial resource cost of an approximate BQ is likely to be lower than for a firm BQ, but the need for re-measurement invariably results in an overall higher resource cost.

2.4.3.3 Although the quantities are approximate, the descriptions of work items should be correct.

2.5 Preparation of bill of quantities

2.5.1 Bill of quantities (BQ) are produced at 'RIBA Work Stage G (Tender Documentation)' or as an intrinsic part of 'OGC Gateway 3C (Investment Decision)'. The requirements of RIBA Work Stage G, as described in the RIBA Outline Plan of Work, are as follows:

Preparation and/or collation of tender documentation in sufficient detail to enable a tender or tenders to be obtained for the project.

2.5.2 To enable the preparation of BQ, the information resulting from RIBA Work Stages E (Technical Design) and F (Production Information) will be required. The requirements of RIBA Work Stages E and F, as described in the RIBA Outline Plan of Work, are as follows:

Preparation of technical design(s) and specifications, sufficient to co-ordinate components and elements of the project and information for statutory standards and construction safety.

F1 Preparation of production information in sufficient detail to enable a tender or tenders to be obtained.

F2 Application for statutory approvals. Preparation of further information for construction required under the building contract.

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- 2.5.3** The processes defined by RIBA Work Stages E (Technical Design), F (Production Information) and G (Tender Documentation) are commensurate with the processes required to meet the requirements of OGC Gateway 3C (Investment Decision).
- 2.5.4** The information and documents required for the preparation of BQ are described in paragraph 2.14 of these rules.
- 2.5.5** BQ required for a lump sum contract based on firm or approximate quantities will normally be prepared by the employer's quantity surveyor/cost manager, whereas under a design and build contract, the employer's project team will prepare the 'employer's requirements' and the BQ or quantified schedules of work will be prepared by either the main contractor or, more likely, the main contractor's work package contractors. The choice of who quantifies building works is solely down to the employer's preference of contract strategy (see Figure 2.1 below).

Figure 2.1: Responsibility for quantifying building works

Contract strategy	Basis of 'Invitation Documents'	Preparation by
Traditional lump sum	(a) Firm BQ -----	Employer's quantity surveyor/cost manager.
	(b) Approximate BQ	
Design and build	Employer's Requirements	Employer's project team (with compilation normally by the employer's quantity surveyor/cost manager). Note: Quantification of the Employer's Requirements will be carried out by either the main contractor or work package contractors; who will prepare firm or approximate BQ, or quantified schedules of work as appropriate.
Management	(a) Firm BQ -----	} Employer's quantity surveyor/cost manager (or main contractor or work package contractors if 'Invitation Documents' prepared by employer's quantity surveyor/cost manager or main contractor; respectively, are based on either 'specification and drawings' or 'un-quantified schedule of works' (i.e. un-quantified information).
	(b) Approximate BQ	
Management (design and manage)	(a) Firm BQ -----	
	(b) Approximate BQ	
Construction management	(a) Firm BQ -----	
	(b) Approximate BQ	

- 2.5.6** Guidance on the preparation of a bill of quantities (BQ) is given in Appendix A of these rules.

2.6 Composition of a bill of quantities

- 2.6.1** Bill of quantities (BQ) usually comprise the following sections:
- Form of Tender (including certificate of bona fide tender);
 - Summary (or Main Summary);
 - Preliminaries, comprising two sections as follows:
 - Information and requirements; and
 - Pricing schedule;
 - Measured work (incorporating contractor designed works);
 - Risks;

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- Provisional sums;
- Credits (for materials arising from the works);
- Dayworks (Provisional); and
- Annexes.

2.6.2 Form of tender:

2.6.2.1 This is a document that is used to record the main contractor's price for completing the building project (i.e. his tender price). If accepted by the employer, the tender price will become the 'contract sum'. The form of tender can be a separate document.

2.6.2.2 A separate 'certificate of bona fide tender', which is completed by the main contractor to confirm that he has not communicated his tender to other parties, is sometimes inserted after the form of tender. Alternatively, the employer's requirements for confirming that bona fide tender has been submitted by the main contractor can be incorporated in the form of tender.

2.6.3 Summary (or main summary):

2.6.3.1 The summary, sometimes called the main summary, is made at either the front or end of the bill of quantities and comprises a list of the bill that form the entire bill of quantities. The total price for each section of the bill of quantities (BQ) is carried forward and inserted against the applicable item listed in the summary. For example, a summary for an elemental bill will address all or some of the following:

- Preliminaries;
- Measured works (including 'Contractor Designed Works':
 - Facilitating works
 - Substructure
 - Superstructure
 - Internal finishes
 - Fittings, furnishings and equipment
 - Services
 - Complete buildings
 - Works to existing buildings
 - External works
- Risks;
- Provisional sums:
 - Defined
 - Undefined
- Works to be carried out by statutory undertakers;
- Overheads and profit;
- Credits (for materials arising from the works);
- Fixed price adjustment;
- Director's adjustment;
- Dayworks (Provisional);
- Total price (to Form of Tender).

2.6.3.2 Where the measured work has been divided into work sections, the work sections will be listed instead of elements.